

BIONOMICS OF *MONANTHIA GLOBULIFERA* WALK. (HEMIPTERA—HETEROPTERA: TINGIDAE)

BY

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(With five figures)

INTRODUCTION

Very little work has been done on the bionomics of Tingid bugs in India. The bionomics of *Teleonemia scrupulosa* Stål (= *lantanae* Distant) has been described by Khan (1945) and by Roonwal (1952).

Monanthia globulifera Walk. and *Urentius echinus* Dist. are Tingid bugs commonly distributed throughout Uttar Pradesh. *M. globulifera* attracted attention in 1950 when serious damage was caused by it to the leaves of *Ocimum kilimandscharicum* Guerke which was grown experimentally for the production of camphor in Kanpur. It was previously recorded as a pest of *Mentha* leaves all over India. Some aspects of its bionomics are described here.

DISTRIBUTION

Distant (1903, 1910) reported *M. globulifera* from Madras, Calcutta, Trivandrum and Travancore. Fletcher (1914) stated that it was distributed throughout the plains of South India, while Lefroy (1909) recorded it from Madras, Ceylon and Bihar. In U.P. it has been observed and collected from various localities.

FOOD PLANTS

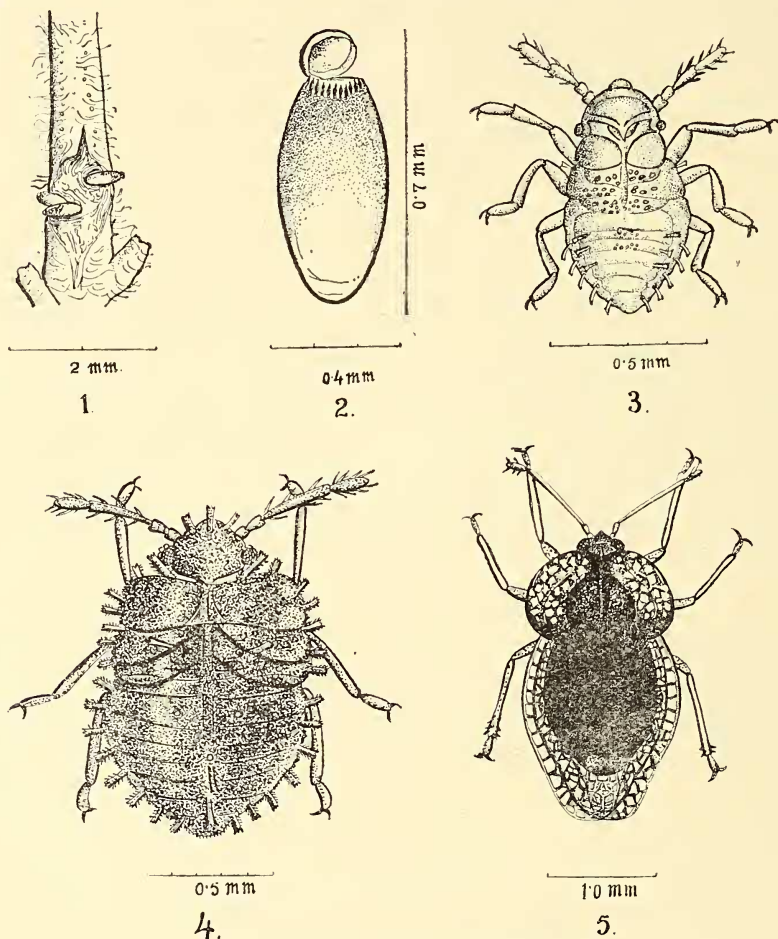
Monanthia globulifera Walk. has been recorded from *Carthamus tinctorius* L. 'safflower' (Fletcher 1914); *Ocimum sanctum* L. 'tulsi'; *Salvia officinalis*, 'English sage'; *Ocimum basilicum* L.; heliotrope and garden coleus (Distant 1903, 1910). In Kanpur, it has been reared and collected from *Ocimum basilicum* L., *O. canum* L., *O. kilimandscharicum* Guerke and *Mentha* plants.

DAMAGE

Damage is caused by the nymphs and adults which suck the sap from the lower side of the leaves. The leaves of *Ocimum* spp. turn yellow and fall down. In the case of *Mentha* plants, the leaves first turn yellow and ultimately become black; they dry up and give the appearance as if the plants have been affected by severe drought. In cases of heavy infestation the entire plantation of *Mentha* and *Ocimum* may be wiped out, leaving only bare shoots.

DESCRIPTION OF STAGES

Egg.—0.5 mm. long, 0.2 mm. broad (mean of 10 observations); oblong oval posteriorly with the posterior pole rounded, corresponding to the posterior end of embryo. Anterior or cephalic end broad



Stages of *Monanthia globulifera* Walk.

- Fig. 1. Twig of *Ocimum sanctum* L. showing eggs glued in the pit
 Fig. 2. One egg showing operculum
 Fig. 3. First stage nymph
 Fig. 4. Third stage nymph
 Fig. 5. Adult

with a cup-shaped operculum having a circular rim. Operculum fits into mouth of the egg-body. Anterior end fringed with about 12 small, pointed processes corresponding to the micropylar canals in *Teleonemia scrupulosa* Stål (Roonwal, 1952). The 'micropylar canal fringed mouth' of egg-body visible even when operculum is closed;

also clearly seen in egg-shell when operculum has been removed or raised up after hatching. Chorion smooth. Egg of light colour when freshly laid becoming dark yellowish later on. Anterior one-third of egg-body darker than posterior area which is lightly dark ochraceous.

Nymphal Stages.—There are five instars. The length increases from 0.5 mm. in the first stage nymph to 2.3 mm. in the adult.

First stage.—Length 0.5 mm.; breadth (II and III abdominal segments) 0.3 mm. General body colour ochraceous somewhat darkish yellow on the head and thorax; compound eyes reddish. Antennae ochraceous, 4-jointed; first segment short and stout, 0.02 mm. long; second 0.04 mm. long; third 0.08 mm. long with about 4 sensory hairs; fourth longest, 0.1 mm. long, sub-globose with several sensory hairs; situated anteriorly and is somewhat darker than the rest. Head and abdominal segments carrying stout hair-like processes which are smooth on the sides; those on the dorsum are somewhat funnel-like at the terminal end. Labium reaching upto the hind coxae, darkish terminally. Thorax with some dark granular spots on the dorsal side. Legs ochraceous, coxae broad and dark ochraceous, trochanter short, femur and tibia fairly long. Tarsus one-jointed, about 0.08 mm. long with a pair of prominent claws at the terminal end.

Second stage.—Length 0.9 mm.; breadth 0.4 mm. General coloration slightly darker than the first stage. Joints of antennae longer and similar to the first stage.

Third stage.—Length 1.4 mm.; breadth 0.7 mm. (II and III abdominal segments). General colour of the body black. Compound eyes reddish. Antennae 4-segmented and blackish yellow; first segment 0.05 mm. long; second 0.06 mm. long; third longest, 0.2 mm. with about six hairs; fourth 0.1 mm. long, sub-globose and with several hairs situated anteriorly. Head, thorax and abdomen carry stout black processes [called 'lobular prominences' by Roonwal (1952)], dorsally and laterally; maximum length of the lobular prominences 0.1 mm.; with finely serrated sides ending in four small terminal processes. Legs yellowish black with one-jointed tarsus ending in a pair of well defined claws. Rudiments of wing-pads visible.

Fourth and fifth stages.—Body jet black, with reddish eyes. Antennae 4-segmented and dark, similar to the third stage but larger. Wing-pads greatly developed over abdomen.

Adult.—Length 2.3 mm. (without antennae); breadth 1.1 mm. Antennae ochraceous, 4-segmented; first segment 0.08 mm. long; second of same size as first; third longest, 0.5 mm. long; fourth 0.2 mm. long with several hairs, darker ochraceous than the rest; total length of antennae 0.9 mm. Vertex 0.2 mm. broad; thorax 1.2 mm. broad. Legs ochraceous, femur dark; tibia with short spines; tarsi and claws dark ochraceous. Hemelytra raised, forming discal elevations at two places; divided into costal, subcostal, discoidal and sutural areas; length of hemelytra 2.0 mm., breadth 0.7 mm. Hindwings hyaline with somewhat indistinct costal vein and a cell below with two veins radiating to the anterior part of margin. Hind cubitus with a bifurcated vein. Anal areas of hind-wing having marked anal

veins. Length of hind-wing 1.7 mm.; breadth 0.6 mm. Rest of the description is similar to that given by Distant (1903).

LIFE-HISTORY AND SEASONAL-HISTORY

Mating occurs throughout the year, but is seen common from March to June and less frequent from July to February. Eggs are laid inside the tender stems or shoots and are partially inserted into the tissues; the latter, on drying, appear as a scar. The eggs are glued to the place of insertion by a small quantity of viscous fluid which is given out by the female after egg-laying. Eggs are generally laid in groups and seldom singly. They are inserted obliquely and the opercular portion protrudes outside. A single female laid 28 eggs (April, 1951) and 10 eggs (January, 1952). There is considerable variation in the duration of egg-laying and in the number of eggs laid by a single female in different seasons of the year. The duration of egg-laying was 4 days in April 1951, 6 days in May 1951 and 13 days in January, 1952. The number of eggs laid was from 12 to 28 in April, 1951, 20 in May, 1951 and 8-10 in January, 1952. Hatching takes place by the opening of the operculum which after hatching generally remains attached to one side of the egg-opening. At the time of hatching some wriggling movement and some expansion and contraction of the head of the embryo is observed inside the egg. This seemingly causes pressure on the operculum which is forced open. The hatching period appears largely to depend upon atmospheric temperature. Observations in different months indicate that the eggs hatched in 7-8 days in March, 1951, in 8 days in May, 1951, in 7 days in June, 1951 and in 12-20 days in January, 1952.

There are 5 nymphal instars. The total nymphal period was 15 days in March, 1951, 14 days in April to June, 1951, and in January, 1952. The shortest life-cycle took 21 days in May, 1951 and 45 days in December, 1951 and January, 1952. Owing to shorter life-cycles from March to June, a heavy population of the bugs is built up.

Monanthia globulifera Walk. is found all the year round on the perennial *Ocimum sanctum* L. and other species of *Ocimum* occurring in the locality. If there is a plot of mint cultivation nearby, migration occurs by flight which is partly assisted by wind. Mint plantations get the first infestation in this way and subsequently breeding on mint begins. Breeding occurs throughout the year on food-plants.

FLIGHT AND DISPERSAL

The adult is capable of short flights. The distance which it can fly at any one time in the calm air of the laboratory varied from 4 to 18 inches. In May and June, 1950, an experiment was made by releasing 50 adults which were marked with a drop of red oxide of mercury and varnish in the proportion of 1:3. The nearest plantation of *Ocimum* and *Mentha* was at a distance of about 85 ft. The passage lay through rows of crotons and grassland. After liberation, the adults were observed to disperse in all directions and appeared to have been lost in the grassy patch. After 56 hours only four adults were observed on *Mentha* leaves. The adults are light and

they can be drifted by wind to long distances from sources of infestation. Generally new patches of *Mentha* cultivation get the infestation from infested *Ocimum* plants in the vicinity.

PREDATORS

Grubs of *Brumus saturalis* F., *Chilomenes sexmaculatus* F. and *Coccinella septempunctata* L. have been observed to feed on the nymphal stages of *Monanthia*. The adults and grubs of these Coccinellid beetles have been commonly seen on *Ocimum* plants. *Coccinella septempunctata* L. adults have been observed on *Mentha*. The grubs, however, are not as common on *Mentha* as on *Ocimum* possibly because *Mentha* shoots run close to the ground and the grubs have no easy access to the nymphal stages for feeding.

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